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(71) Applicant(s)

Linde Aktiengesellschaft

(Incorporated in the Federal Republic of Germany)

Abraham-Lincoln-Strasse 21, D-65189 Wiesbaden,
Federal Republic of Germany

(72) Inventor(s)

Rudolf Hendrich

Franz Wind

Ulrich Jochem

(74) Agent and/or Address for Service

Boulton Wade Tennant

27 Funnival Street, LONDON, EC4A 1PQ,
United Kingdom

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(54) Industrial Lift Truck

(57) An industrial lift truck has an accumulator brake (8), the braking torque of which is dependent on the load condition and/or the elevation height of the forks for providing smooth retardation of the vehicle. The accumulator brake can be released electromagnetically and is in operative connection with a control and/or regulating device (7) which constantly influences the braking torque during the operation of the industrial truck and which is connected to a load sensor (5) and/or to an elevation height sensor (6). The accumulator brake is preferably in the form of a permanent magnet brake.

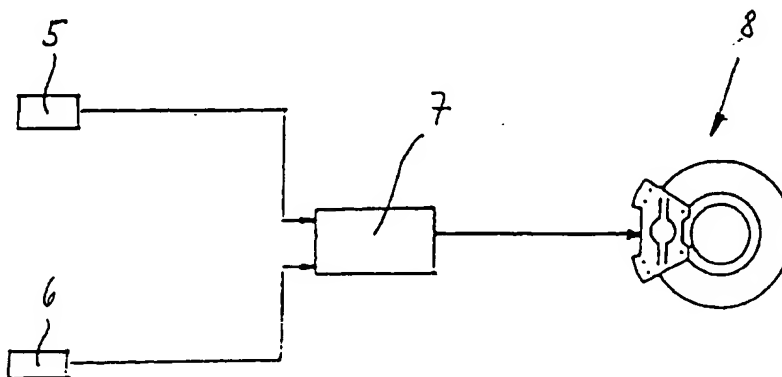


Fig. 3

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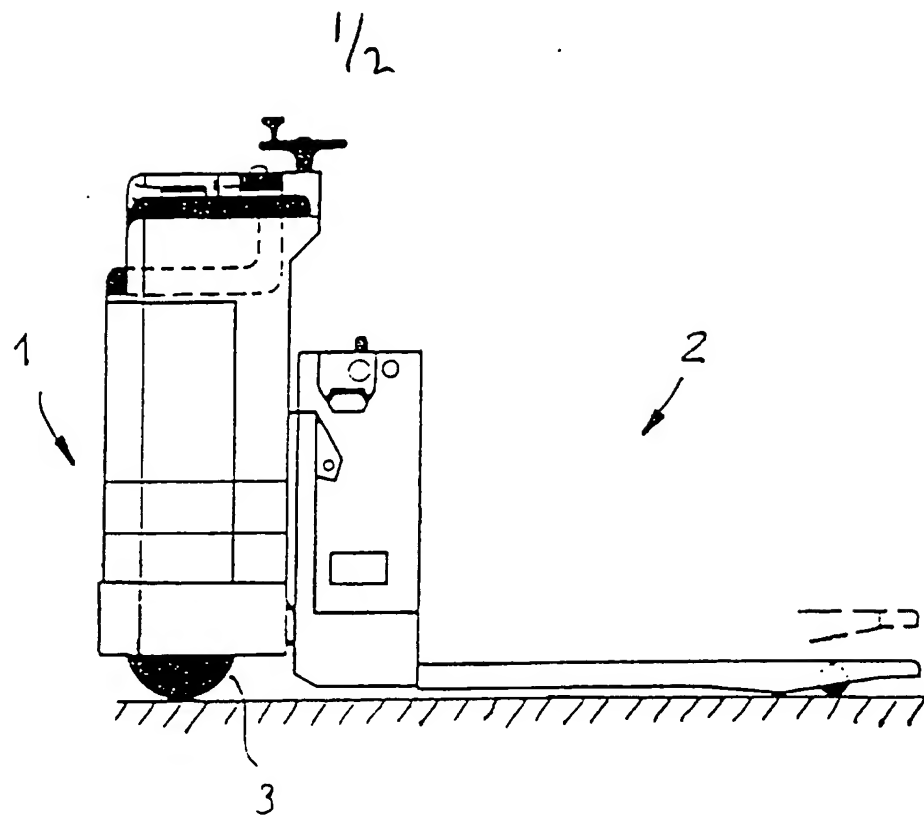


Fig. 1

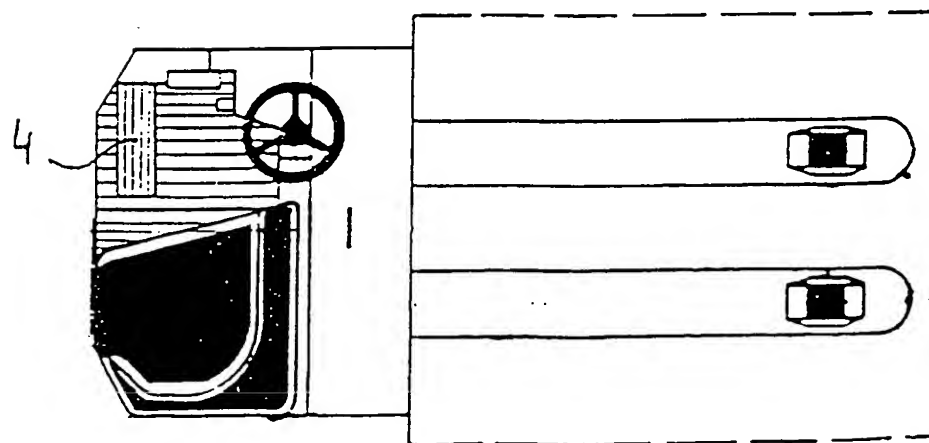


Fig. 2

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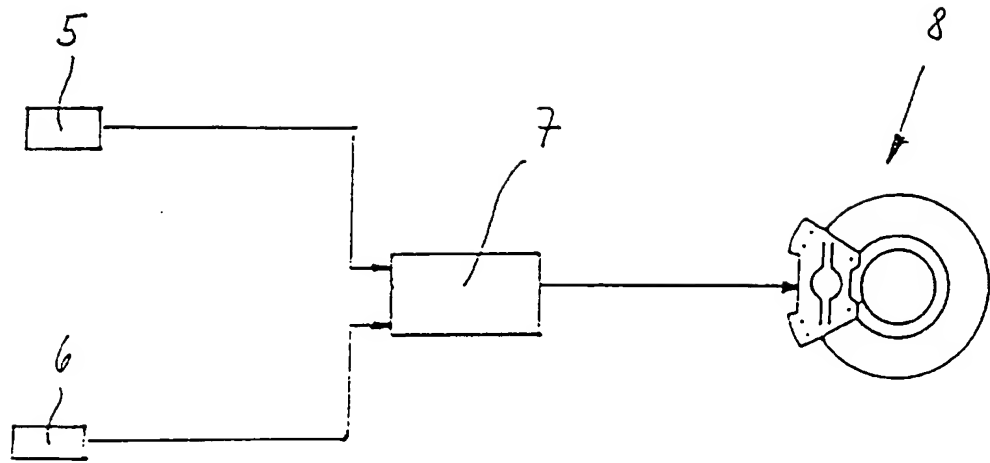


Fig. 3

Industrial truck having an accumulator brake

The invention relates to an industrial truck having an accumulator brake.

In industrial trucks, for example electric lift trucks, the accumulator brake serves, in combination with a so-called deadman's switch, as a safety brake which becomes operative (optionally only after a given delay time has elapsed), when the deadman's switch is not operated, whereupon the braking torque which can be generated by the accumulator brake is then abruptly activated. The accumulator brake is designed so that sufficient braking torque is generated, even under maximum loading of the industrial truck. Due to this design, when operating under no load or low load, the retardation usually takes place in a jerky fashion.

An object of the present invention is to provide an industrial truck of the type mentioned in the introduction, in which smoother retardation is possible.

According to the invention, the braking torque generated by the accumulator brake is dependent on the load condition and/or the elevation height. Therefore, instead of cutting in or cutting out a constant high braking torque, the braking torque is influenced in a controlled manner as a function of the operating parameters of load condition and/or elevation height. It is thereby possible, after the deadman's switch has been released, for the braking torque to be built up and/or limited according to time. Smooth braking is possible even under low load or under no load, the tilting moment of an industrial truck designed in accordance with the invention is reduced and its stability is thereby increased. This is particularly advantageous if the industrial truck is designed as a high-lift truck.

According to an advantageous development of the invention, the accumulator brake can be released

electromagnetically and is in operative connection with a control and/or regulating device which constantly influences the braking torque during the operation of the industrial truck and which is connected to a load sensor and/or to an elevation height sensor. The braking torque is thus influenced as a function of the load condition and/or the elevation height by the control and/or regulating device which is connected upstream of an electromagnetically operated device for releasing the accumulator brake.

A spring-loaded brake can be provided as the accumulator brake. According to one embodiment of the invention, it is an advantage if the accumulator brake is in the form of a permanent magnet brake.

Further advantages and details of the invention will be described in more detail with reference to an embodiment illustrated, by way of example, in the accompanying diagrammatic drawings, wherein:

Figure 1 shows a side view of an electric lift truck;

Figure 2 shows a plan view of the electric lift truck of Figure 1; and

Figure 3 shows an operating diagram of the accumulator brake.

Figures 1 and 2 illustrate an industrial truck according to the invention in the form of an electric lift truck, more precisely an electric platform-type lift truck. The truck has a drive frame 1 and a load frame 2 which can be varied in height relative to the frame 1. At least one electromotively operated drive wheel 3 is mounted on the drive frame 1 and is connected with an accumulator brake (not shown in the drawings). The accumulator brake is released electromagnetically upon actuation of a deadman's switch. Therefore, the vehicle is brought to a standstill in a currentless condition.

Instead of a pedal-type deadman's switch it is also possible to use a deadman's switch in the form of a seat switch. Other suitable systems (for example, a lever or push-

button) are possible, which ensure that when the driver leaves the vehicle the accumulator brake closes optionally with a time delay.

In accordance with the invention, the braking torque of the accumulator brake is dependent on the load condition and/or elevation height. The operating method of the accumulator brake is evident from Figure 3. A control and/or regulating device 7, which is in operative connection with the accumulator brake 8, is acted upon in response to signals from a load sensor 5 and/or a elevation height sensor 6. Depending on the magnitude of the load situated on the electric lift truck and depending on the elevation height, a desired value for the braking torque is generated in the control and/or regulating device 7 and the accumulator brake 8, which is normally released when the electric lift truck is moving, is closed to a greater or lesser degree when the deadman's switch is released so that the load-dependent and elevation-height dependent braking torque is operative. In this case it is possible for the control and/or regulating device 7 to limit the effective braking torque. However, the braking torque may also be built up to the maximum possible value, the time lapse being determined by the load condition and/or the elevation height.

CLAIMS

1. An industrial truck having an accumulator brake, wherein the braking torque generated by the accumulator brake is dependent on the load condition and/or the elevation height.
2. An industrial truck according to Claim 1, wherein the accumulator brake can be released electro-magnetically and is in operative connection with a control and/or regulating device which constantly influences the braking torque during the operation of the industrial truck and which is connected to a load sensor and/or to an elevation height sensor.
3. An industrial truck according to Claim 2, wherein the accumulator brake is in the form of a permanent magnet brake.
4. An industrial truck substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

Patents Act 19775**Examiner's report to the Comptroller under Section 17
(The Search report)**Application number
GB 9519322.3**Relevant Technical Fields**

(i) UK Cl (Ed.N) B8H (H17), F2E (EQ)

(ii) Int Cl (Ed.6) B62B 3/06, 3/065, 5/04

Search Examiner
D MCMUNNDate of completion of Search
4 DECEMBER 1995**Databases (see below)**(i) UK Patent Office collections of GB, EP, WO and US
patent specifications.Documents considered relevant
following a search in respect of
Claims :-
1-4

(ii) ONLINE: WPI

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Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 1301826	(LINDE) see whole document - one example of this type	1-3
X	EP 0362517 A1	(JUNGHEINRICH) see whole document	1-3
X	EP 0446421 A1	(JUNGHEINRICH) see whole document	
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